

REMARKS

By this amendment, the claims have been modified to overcome the objections/rejections under 35 U.S.C. §112, second paragraph, and to make it more evident that Applicants' claimed method involves a *feedback-controlled* direct-metal deposition process (DMD™) involving optical monitoring of a deposit to optimize dimensional tolerance. New product-by-process claims 6-12 have also been added.

Claims 1 and 2 stand rejected under 35 U.S.C. §102(b) over Kar et al. ('861). Kar resides in a "one-step" rapid manufacturing process to create prototyping parts (see Abstract). Although a laser and feed material are used, there is absolutely no teaching or suggestion of feedback of any kind, optical or otherwise. That is, in clear distinction to Applicants' claimed process, the system and method of Kar et al. clearly function in an "open-loop" mode only. Given that anticipation requires the teaching of each and every element of a claimed invention, rejection under 35 U.S.C. §102 is expressly precluded. RCA Corp. v. Applied Digital Data Systems, 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir. 1984).

Claim 1 stands rejected under 35 U.S.C. §102(e) over Lewis et al. ('960). However, with Applicants' clarification as to the steps associated with feedback-controlled direct metal deposition (DMD™), it should be clear that anticipation is precluded on the grounds that Lewis fails to teach or suggest the use of optical feedback to control a physical dimension of an alloy being deposited.

Claims 1-3 stand rejected under 35 U.S.C. §103(a) over Singer et al. ('830) in view of Lewis et al. ('960). As the Examiner points out, Singer teaches a tool used for high-pressure die casting, and fails to disclose the method of Lewis in terms of fabrication. In fact, the technique described by Singer resides in the deposition of a single steel layer (3) followed by a single copper layer (4) on a die or mold surface using a spray molten metal technique. Alternatively, Singer proposes metal spray deposition of

alternating copper and tool steel materials followed by machining (drilling) of the cooling channels in the fabricated structure. As such, *alloying*, as well would be understood of any one of skill in the art, is simply not taught.

The Examiner goes on to assert that "it would been obvious ... to produce the tool of Singer by the process according to Lewis. By doing so, prototyping and production times are decreased." It is well settled, however, that in order to sustain an obviousness rejection there must be a reason why one having ordinary skill in the pertinent art would have been led to combine references to arrive at Applicants' claimed invention. Moreover, there must be something *in the prior art* that suggests the proposed modification, other than the hindsight gained from knowledge that the inventor choose to combine these particular things in this particular way. Uniroyal Inc. v. Rudkin-Wiley Corp., 837 F.2d 1044, 1051, 5 USPQ2d 1434, 1438 (Fed. Cir. 1988). The Examiner is further required to make specific findings on a suggestion to combine prior art references. In Re Dembeczak, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19 (Fed. Cir. 1999).

In this case, there is no teaching or suggestion whatsoever in Singer et al. to use the process of Lewis, and, in fact, there *is* disclosure regarding processes *other than that disclosed by Lewis*. Furthermore, even if Singer and Lewis were combined, Applicants' claimed process would not result, given the use of feedback control used to monitor a physical characteristic of the alloy being deposited, an aspect about which both references, even in combination, are silent.

Claims 1-3 stand rejected under 35 U.S.C. §103(a) over Singer et al. in view of Kar. Applicants' argument to this rejection is similar to that used with regard to the combination of Singer and Lewis; namely, that Singer does not teach alloying, that neither reference teaches optical feedback, and that the combination of references is not taught or suggested *by the prior art*.

Claim 4 stands rejected under 35 U.S.C. §103(a) over Lewis or Singer in view of Lewis, and further in view of Weiss et al. As to the addition of Lewis et al., Applicants will assume that it must be Singer as the primary reference, since Lewis would not be combined with Lewis. The Examiner states that "Weiss teaches that tools may be formed in halves that can be open [sic] and close in order to remove the part." While Applicants do not disagree with this observation, that it is not Applicants' invention. Rather, it is the use of feedback-controlled direct-metal deposition (DMD™) process to form an alloy-variant structure around the interface of a tool that opens and closes, and not the tool itself using, for example, some other process.

The Examiner further states that "to provide opening and closing means to the tool produced by Lewis, or Singer in view of Lewis, would have been obvious [so that] the part produced by the tool may be removed." However, the capability of a structure to *remove a part*, does not, in and of itself, imply or suggest a particular method for fabricating such a tooling. Given that there is no teaching or suggestion *from the prior art* to support the combination of references advanced by the Examiner, *prima facie* obviousness cannot be established.

Claim 4 stands rejected under 35 U.S.C. §103(a) over Kar et al. or Singer et al. in view of Kar et al., and further in view of Weiss et al. Applicants' response to this rejection is similar to that used in rejecting claim 4 over Lewis or Singer in view of Lewis, and further in view of Weiss et al. To reiterate, the construction of a tool by itself that may be opened and closed is not Applicants' invention, but rather, the use of a novel process to produce such tooling having an interface fabricated using a novel method.

Claim 5 stands rejected under 35 U.S.C. §102(a) over Singer et al. in view of Lewis et al. and further in view of Thompson (handbook). Claim 5 adds to claim 1 that the tooling produced according

to the method is a die-cast mold having a gate area, with H19 steel being used in conjunction with the fabrication of the gate area and H13 steel being used in conjunction with the fabrication of non-gate areas. As with certain of the other rejections referenced above, Applicants are *not claiming* the use of H13 or H19 steel. Applicants are well aware that these types of steels exist, and is using a novel feedback-controlled laser assisted direct metal deposition (DMD™) process to fabricate the gate and non-gate areas. Without a teaching or suggestion *from the prior art* to carry out these steps, *prima facie* obviousness cannot be established. The same holds true of the rejection of claim 5 over Singer et al. in view of Kar et al., and further in view of the Thompson handbook.

Based upon the foregoing amendments and comments, Applicants believe all claims are in condition for allowance. Questions regarding this application can be directed to the undersigned attorney at the telephone/facsimile numbers provided.

Attached is a version showing the changes made to the specification and claims 1 and 4.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADEIN THE SPECIFICATION:

Page 1, lines 2-5:

This application claims priority of U.S. provisional patent application Serial No. 60/202,590, filed May 9, 2000; and is a continuation-in-part of U.S. Patent Application Serial No. 09/670,670, filed Sept. 27, 2000, now U.S. Patent No. 6,472,029; which is a continuation-in-part of U.S. patent application Serial No. 09/570,986, filed May 15, 2000, now U.S. Patent No. 6,410,105; which is a continuation-in-part of U.S. patent application Serial No. 09/107,912, now U.S. Patent No. 6,122,564, and also claims priority from U.S. provisional application Serial No. 60/156,202, filed September 27, 1999, the entire [contents] content of each application being incorporated herein by reference.

IN THE CLAIMS:

1. (Amended) [A] An improved tooling fabrication method, comprising the steps of:
depositing a first metallic or ceramic alloy using a feedback-controlled laser-assisted direct metal deposition process in a first region of the tooling requiring high thermal or wear resistance; [and]
depositing a second metallic or ceramic alloy using [a] the feedback-controlled laser-assisted direct metal deposition process in a second [area] region of the tooling requiring high strength or impact resistance; and

wherein the feedback-controlled laser-assisted direct metal deposition process further includes the steps of:

providing a description of the tooling to be fabricated,

heating the first and second regions of the tooling with a laser sufficient to form a localized meltpool,

feeding material into the melt pool such that the metallic or ceramic alloy being deposited has a physical dimension,

optically monitoring the physical dimension, and

automatically controlling the physical dimension metallic or ceramic alloy being deposited in accordance with the description of the article to be fabricated.

4. (Amended) The method of claim 1, wherein:

the tooling [includes in] opens and closes at an interface [associated with opening and closing];

and

the second metallic or ceramic alloy is deposited relative to the interface.